

certain even yet, that anaërobie action is absolutely necessary at any stage of sewage purification. Many other equally important questions might be instanced on which knowledge is still extremely limited.

The outstanding result of the Royal Commission's labours which will most appeal to local authorities is the statement that adequate purification can be effected without land treatment, which, if recognised by the Local Government Board, will remove what is, in many cases, an impossible restriction. Their recommendation in regard to a central controlling and advisory authority, if resulting in the creation of a department similar to the Massachusetts Board of Health, may prevent great waste of public money. Such a board might exercise wise discretion as to the amount of purification necessary under given conditions. No central control, however, can be effective without efficient local management, and Mr. Thudicum's little book of simple methods of sewage analysis will be of great assistance to local engineers and intelligent works managers, and will help to lighten the work of the trained specialist, with whom the solution of difficulties ultimately rests. G. J. F.

AN AMERICAN CONTRIBUTION TO IRCHÆOLOGY.

University of Pennsylvania: Transactions of the Department of Archaeology: Free Museum of Science and Art. Vol. i. Parts i. and ii. Pp. 125. (Published by the Department of Archæology, 1904.)

THE most important article in this volume is the description of the American excavations at Gournià, in Crete, which have already been referred to in the pages of NATURE (September 15, 1904, p. 482). Miss Harriet A. Boyd, the leader of the expedition, gives a full and very interesting description of her work, illustrated by photographs which give the reader a very good idea of the beautiful scenery of the Gulf of Mirabello (well bestowed name!), on the shores of which she found her work. No more delightful spot for archæological exploration could be imagined. Leaving the rather arid and uninteresting Candiotte shore, near which Knossos lies, dominated by the towering hill of Iuktas, on the top of which, so legend says, the god Zeus died and was buried, the traveller skirts the base of the Lasithiote mountain-mass and reaches the narrow isthmus of Hierápetra (the ancient Hierapytna). Before him rises a magnificent rocky wall of mountain, Thriphte by name, behind which is the peak called the Aphendi, or Lord of Kavóusi, the village which lies at its foot. This wall is rent by a mighty cleft, the chasm of Thriphte, which is one of the dominating features of the landscape. Along the base of the wall runs the high-road from Kavóusi to Hierápetra across the isthmus, which is low-lying land, forming a complete break in the mountain-backbone of Crete. On the northern shore of the isthmus is a good beach, Pachyammos ("Deep-sand") by name; in the centre of it the traveller will see a large white house.

This was Miss Boyd's headquarters. All around are splendid mountains and "a coast-line as picturesque

as any in Southern Europe," to quote her description, which is not exaggerated; she might have said "more picturesque than," with reason. Away to the left are the snowy heights of Lasithi, the hills above the *skála* or landing-place of Ayios Nikólas, and distant rocky Spinalonga, still the home of a peculiar race of Mohammedan fishermen—corsairs not so very long ago. To the right is the little isle of Psyrà, swimming in the blue water. One would think that the excavators on the monotonous plains of Babylonia, whose doings are chronicled by Prof. Hilprecht in the last contribution to this volume,¹ would have given much sometimes to have been able to transport themselves for a brief space to such goodly surroundings!

Pachyammos lies a mile or so beyond, and east of, the scene of Miss Boyd's work, the low hill of Gournià, on which she has discovered the remains of a "Mycenæan," or more correctly "Minoan," town, a Bronze age settlement. It is a small Pompeii. One can walk up the sinuously curving little main street and look right and left into the ruined houses of the Bronze age "Minoans." There is even a sort of court-house or "palace," to give it the stereotyped appellation, with its right-angle of low steps quite on the model of the splendid right-angled stairways of Knossos and Phaistos, which Dr. Evans considers to have been theatres, the prototypes of the stepped Greek theatres of the classical period. This "palace" must have been the official centre of the town. Formerly, judging from classical analogies, one talked of a prince or "dynast" ruling from every one of these little palaces over his own little *πόλις* or city-state; but it will probably eventually be found that the ruler who lived in such a "palace" as that of Gournià was no more than a mere mayor or demarch, a member of an official bureaucracy analogous to that of ancient Egypt, dependent upon the metropolitan authorities at Knossos. It becomes more and more probable that Crete in Minoan days was a homogeneous and highly organised State like Egypt, not a mere congeries of a hundred warring villages, as in classical times.

The official centre was not the religious centre of the town. The cathedral of Gournià stood in the middle of the town, and was approached by a special street of its own.

"Not imposing as a piece of architecture," writes Miss Boyd (p. 41), "it is yet of unique importance as being the first 'Mycenæan' or 'Minoan' shrine discovered intact. The worshipper ascended three steps and through a doorway 1.50 m. wide entered an enclosure, about 3 m. square, surrounded by walls half a metre thick and 50 to 60 cm. high. The floor is of beaten earth."

The more noteworthy of its contents are

"a low earthen table, covered with a thin coating of plaster, which stands on three legs and possibly served as an altar, four cultus vases bearing symbols of Minoan worship, the disc, consecrated horns and double-headed axe of Zeus, a terra-cotta female idol entwined with a snake, two heads of the same type as

¹ Very curiously described as "A Lecture delivered before German Court and University Circles, by H. V. Hilprecht." In it Prof. Hilprecht tells us little or nothing about the excavations at Nippur that has not already appeared in his "Explorations in Bible Lands," and the photographs published are already well known to archæologists.

the idol, several small clay doves and serpents' heads, all of coarse terra-cotta, and a fragment of a pithos, on which a double-axe and disc are modelled in relief."

This important find has since been paralleled by Dr. Evans's discovery at Knossos of a similar shrine of the snake-goddess with fine glazed faience figures, referred to in *NATURE* (vol. lxx. p. 482). But Miss Boyd was the first to discover the Minoan snake-goddess, of whose existence we had no inkling before the excavations at Gourniã.

Another good find, of which Miss Boyd gives a fine facsimile plate, was the head of a bull in terra-cotta, a typically "Mycenæan" object, paralleled by the famous silver bull's head found by Schliemann at Mycenæ, and the Egyptian representations of golden *protomæ* of bulls being brought as gifts to the court of Thothmes III. by the Mycenæan (or rather "Minoan") ambassadors from "Kefti" (Crète).

Miss Boyd's work has contributed results to Mycenæan lore which are of the highest importance, results upon which the officers of the American Exploration Society at Philadelphia, which dispatched her expedition, are to be heartily congratulated.

H. R. HALL.

ELECTRICAL THEORY AND PRACTICE.

Maxwell's Theory and Wireless Telegraphy. By H. Poincaré and F. K. Vreeland. Pp. xi+255. (London: A. Constable and Co., Ltd., 1904.) Price 10s. 6d. net.

Alternating Currents. Vol. i. By A. Russell. Pp. xii+407. (Cambridge: The University Press, 1904.) Price 12s. net.

What Do We Know Concerning Electricity? By Antonia Zimmern. Pp. vii+140. (London: Methuen and Co., n.d.) Price 1s. 6d. net.

Modern Electricity. By J. Henry and K. J. Hora. Pp. 355. (London: Hodder and Stoughton, 1905.) Price 5s. net.

Modern Electric Practice. Vol. v. Edited by M. Maclean, Pp. vi+287. (London: The Gresham Publishing Co., 1904.) Price 9s. net.

Electricity Control: A Treatise on Electric Switch-Gear Systems of Electric Transmission. By Leonard Andrews. Pp. xv+231. (London: Chas. Griffin and Co., Ltd., 1904.)

THE electrical engineer who wishes to keep pace with the development of his profession and desires to know something more than that which concerns only the particular branch in which he is engaged has a very hard task before him at the present day. He must, in the first instance, endeavour to keep an eye on the technical literature—the innumerable journals and proceedings, the monthly magazines, and the weekly papers—of at least four countries in three different languages. This is in itself a task of no mean difficulty, which is heightened rather than diminished by the various "abstracts" available. So rapid is the multiplication of journals and papers that one is tempted to think that the best advice to give a student would be to read nothing, as if he tries to read much he will waste more time over what is of no value to him

than he will spend wisely on the one useful article in a thousand; one is tempted still more to wish that a rigorous technical censorship might be instituted which would allow nothing to find its way into print but that which was of permanent value to the world. In this way the amount of technical literature might be brought within reasonable limits by being reduced to, say, one-tenth of its present volume.

If this is true of the matter which is published in journals—which has, at least as a rule, the merit of originality—it is still more true of the matter which appears in the form of technical text-books. We imagine these books find a ready sale, else we cannot account for their publication; yet we do not know by whom they are read except the reviewers. This is exemplified by the six volumes before us, all of which have appeared within the last few months. With the exception of the first two, we would venture to say that it would have been just as well, and possibly even better, had they not been published. We do not mean thereby that they are bad books, though one of them we think, should not be left about where young electricians might see it; but they are not of merit enough to justify the expense of their publication or purchase.

Take, for example, Miss Zimmern's little volume; it is tastefully bound and clearly printed on good paper—there is something in its appearance strongly suggestive of a book of minor poetry. Add to this that it is pleasantly written and that there is nothing very seriously wrong with its statements, and its merits are summed up. On the other hand, we are confident that it would fail in its object of explaining the complex theories of modern electricity to the "general reader"; he might put down the book with the feeling that his knowledge had been increased, but it would be a mistaken notion. It requires genius of a very rare kind, such as was shown by Faraday in his "Chemical History of a Candle," or by Prof. Perry in his "Spinning Tops," to write a book of this kind; we intend no disparagement to the writer of this volume by saying that such genius is not shown in it.

Messrs. Henry and Hora's volume is of another stamp; in a preface which reads like a publisher's advertisement, the authors state that "the work will be found eminently practical, scientific, and accurate." We have found it quite the reverse, and feel sorry for the "apprentice" or "artisan" who "gains a complete knowledge of the fundamental principles of electricity" from its pages. This is a book which no self-respecting electrical censor, however lenient, would have allowed to appear in print.

The two last books on the list are not without merit or value, but it is at best of an ephemeral kind. Of "Modern Electric Practice" we have already expressed our views in writing of the previous volumes; the present one does not depart from the same high standard in production, and the three articles in section iv., dealing with boilers, engines, and auxiliary plant, are well written and well illustrated. The article on electrochemistry and electrometallurgy is less satisfactory. We must confess, however, that the inaccuracies noticed in previous volumes make us, unjustly perhaps, suspicious of the figures and data in the one be-